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April 4, 1990

TO: File

FROM: Tony Gallegos, Reclamation Engineer *adg.*

RE: Meeting Documentation, Moab Salt, Incorporated, Cane Creek Mine,  
M/019/005, Grand County, Utah

On April 3, 1990, Messrs. Eric York, Alan Tapp and Gordon Matheson representing Moab Salt, Inc. met with myself and Wayne Hedberg at the Division of Oil, Gas and Mining offices. The purpose of the meeting was to informally discuss the subsidence issues raised in a February 27, 1990 letter from the Division to Moab Salt.

Regarding future mining plans, Moab Salt indicated they currently have three active wells. One primary injection well, one secondary injection well and one extraction well. No additional wells are planned unless one of the existing three fails. The active wells are located in the northern half of the mine workings.

Regarding the contention that the salt formation is reducing the extent of the underground workings Moab Salt presented two supporting points. First, Moab Salt is required by their State Health Dept. Class III Injection Well Permit to maintain the injection/extraction ratio at 1.04 or less. The current estimate of this ratio is 0.96 and it was claimed that the ratio had never been above 1.0 during the current ownership. A ratio less than 1.0 implies that the volume of fluid injected has not been increased in order to replace the estimated 4% volume of mineral material removed from the workings. This implies that the mine volume is decreasing instead of increasing. The second point presented was an article detailing a closure measurement study performed at the Cane Creek Potash Mine circa 1966. This work was performed when the mine was a room and pillar operation and basically states the mine openings were experiencing closure at that time.

Regarding the accuracy of the current subsidence prediction, an additional subsidence evaluation was performed for Moab Salt by Schnabel Engineering Associates. Mr. Gordon Matheson presented the information in graphical form. The graph shows the

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boundary of the underground workings, the Colorado River, the predicted limit of subsidence, and predicted subsidence contours of 2 and 4 inches. Mr. Matheson indicated the values shown were conservative and based on a worst case analysis using the methods described in the National Coal Board Subsidence Engineer's Handbook. The graph shows a maximum predicted subsidence of 4 inches under an approximate 1000 ft section of the river. Due to the self-healing characteristics of salt and the additional salt beds overlying the mine workings, Moab Salt felt the Colorado River would not be impacted by subsidence due to mining.

Regarding the accuracy and basis of a previous subsidence survey, Moab Salt presented a revised table of the survey information. Due to the impermanence of some of the survey points and inconsistency of the data presented, the survey provides information that is of questionable accuracy. Some of the subsidence values shown are at the limits of accuracy for the survey method. Moab Salt will send the Division a copy of the revised survey information after checking and reevaluating their records further.

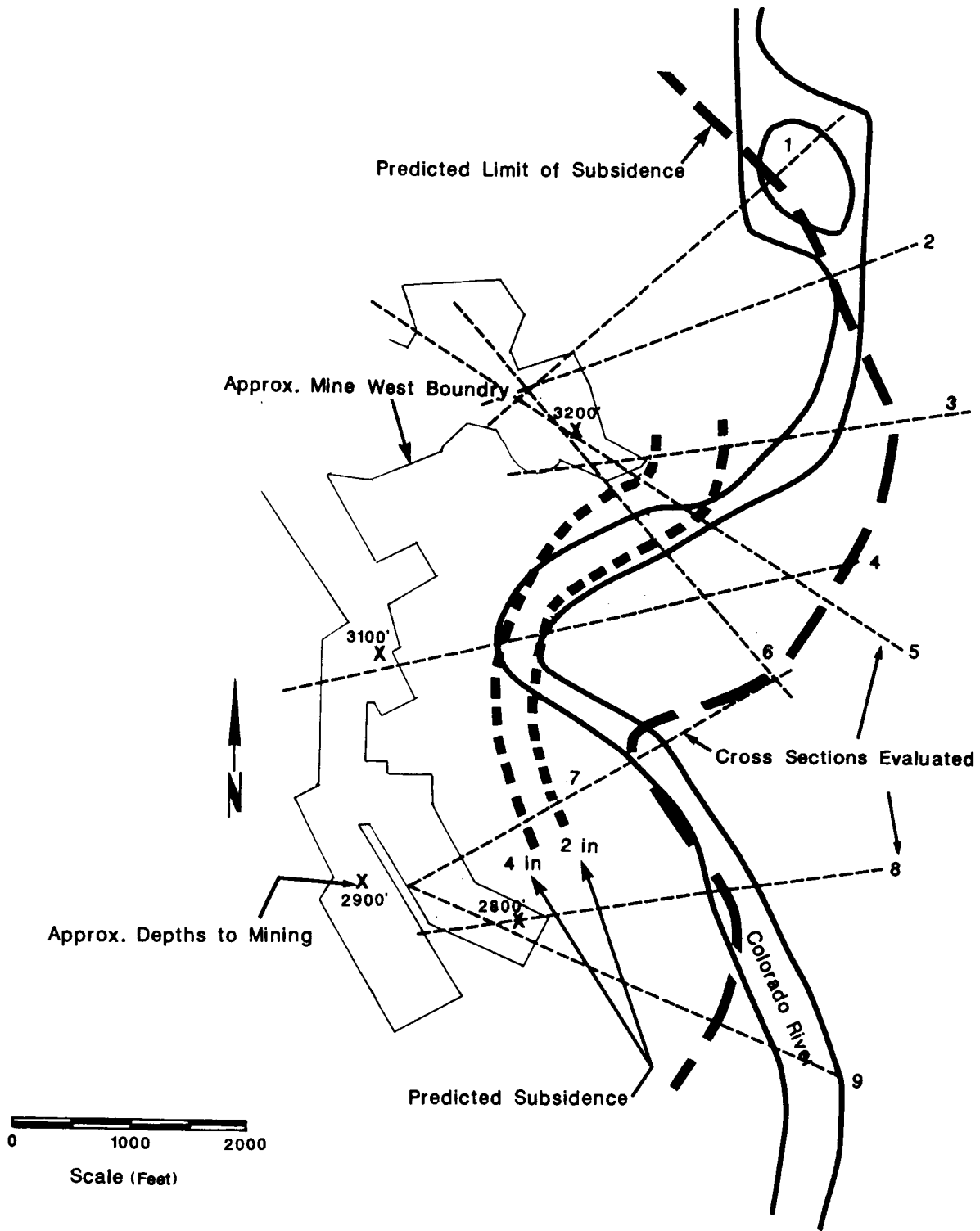
Regarding the possibility of subsidence fractures extending to the surface, Moab Salt responded that this is unlikely because of the salt exhibiting plastic flow characteristics and being somewhat self-healing. The 3000 ft depth of cover and the extent of additional salt beds overlying the mine workings were also expected to inhibit fractures from reaching the surface. If surface fractures were to occur they would most likely be in the areas of maximum predicted subsidence.

Moab Salt was informed that the main focus of the meeting was to address the Division's concern with the possible impact of subsidence on the Colorado River. The meeting concluded with the understanding that the Division would review the information presented and send a written response to Moab Salt.

AAG/jb

cc: Eric York, Mine Mgr. Moab Salt, Inc.  
Lowell Braxton  
Wayne Hedberg  
Holland Shepherd

WMN/4-5



## Moab Salt Subsidence Evaluation